HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Whitehorse Pond Winter Steelhead Program
Species or Hatchery Stock:	Stillaguamish Winter Steelhead (Onchorynchus mykiss)
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Stillaguamish River Puget Sound
Date Submitted:	March 17, 2003
Date Last Updated:	February 4, 2003

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Whitehorse Pond Winter Steelhead Program

1.2) Species and population (or stock) under propagation, and ESA status.

Stillaguamish River Winter Steelhead (*Onchorynchus mykiss*) - not listed

1.3) Responsible organization and individuals

Name (and title):	Chuck Phillips, Region 4 Fish Program Manager Chuck Lavier, Skagit Complex Manager	
Agency or Tribe:	Washington Department of Fish and Wildlife	
Address:	600 Capitol Way North, Olympia, Wa. 98501-1091	
Telephone:	(425) 775-1311 Ext 120	(360) 864-6135
Fax:	(425) 338-1066	(360) 864-6122
Email:	**phillcep@dfw.wa.gov**	**laviecml@dfw.wa.gov**

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

1.4) Funding source, staffing level, and annual hatchery program operational costs.

The Whitehorse Hatchery rearing program is funded by State Wildlife funds.

1.5) Location(s) of hatchery and associated facilities.

Whitehorse Pond is located 1.5 miles upstream of the mouth of Whitehorse Springs Creek (WRIA 05.0254A). The creek is a tributary to the NF Stillaguamish River (05.0135) at RM 28 from its confluence with the mainstem Stillaguamish River (05.0001).

1.6) Type of program.

Isolated Harvest

1.7) Purpose (Goal) of program.

Harvest augmentation

The goal of this program is to provide recreational harvest opportunity.

1.8) Justification for the program.

This hatchery program will be operated to provide fish for harvest while minimizing adverse effects on listed fish. This will be accomplished in the following manner:

1. Hatchery fish will be released as smolts at a time to minimize or eliminate adverse interactions with listed fish.

2. Only appropriate stocks will be propagated.

3. Hatchery fish will be externally marked to distinguish them from wild steelhead.

4. Fish will be acclimated before release when possible.

5. Hatchery fish will be propagated using appropriate fish culture methods and consistent with the Co-Managers' Disease Policy, spawning and genetic guidelines and state and federal water quality standards.

6. These hatchery fish will be harvested at a rate that does not adversely effect wild fish.

7. Juvenile fish produced in excess to production goals will be dealt with appropriately such as by being planted in lakes with no outlets..

1.9) List of program "Performance Standards".

See below

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

Performance Standards and Indicators for Puget Sound **Isolated Harvest** Steelhead programs

Performance Standard	Performance Indicator	Monitoring and Evaluation Plan
Produce adult fish for harvest	Survival and contribution rates	Monitor catch data
Meet hatchery production goals	Number of juvenile fish released - **130,000**	Future Brood Document (FBD) and hatchery records

Manage for adequate escapement where applicable	Hatchery return rates	Hatchery return records
Minimize interactions with listed fish through proper broodstock management and mass marking. Maximize hatchery adult capture effectiveness. Use only hatchery fish	Number of broodstock collected - **150-200**	Rack count data
	Stray Rates	Spawning guidelines Hatchery records
	Sex ratios	Hatchery records
	Age structure	
	Timing of adult collection/spawning - **December to March**	Hatchery records Hatchery records
	Total number of wild adults passed upstream - **only hatchery steelhead taken for broodstock; all wild fished released back to river**	Spawning guidelines
	Adherence to spawning guidelines - **see section 8.3**	
Minimize interactions with listed fish through proper rearing and release strategies	Juveniles released as smolts	FBD and hatchery records
	Out-migration timing of listed fish / hatchery fish - **mid-May (chinook) /May**	FBD and historic natural outmigration times
	Size and time of release - **6 fpp/ May 1-15 release**	FBD and hatchery records
	Hatchery stray rates	Hatchery records (marked vs unmarked)
Maintain stock integrity and genetic diversity	Effective population size	Spawning guidelines
	HOR spawners	

Maximize in-hatchery survival of broodstock and their progeny; and Limit the impact of pathogens associated with hatchery stocks, on listed fish	Fish pathologists will monitor the health of hatchery stocks on a monthly basis and recommend preventative actions / strategies to maintain fish health	Co-Managers Disease Policy
	Fish pathologists will diagnose fish health problems and minimize their impact	Fish health monitoring records
	Vaccines will be administered when appropriate to protect fish health	
	A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings	
	Fish health staff will present workshops on fish health issues to provide continuing education to hatchery staff.	
Ensure hatchery operations comply with state and federal water quality standards through proper environmental monitoring	NPDES compliance	Monthly NPDES records

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

150 to 200 adult winter steelhead

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. (*Use standardized life stage definitions by species presented in* Attachment 2).

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling		
Yearling	Whitehorse Ponds (05.0254A) Pilchuck Creek (05.0062) Canyon Creek (05.0359)	110,000 10,000 10,000

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

1.13) Date program started (years in operation), or is expected to start.

This program was begun in the early 60's with the introduction of Chambers Creek winter steelhead.

1.14) Expected duration of program.

Ongoing

1.15) Watersheds targeted by program.

Stillaguamish River (05.0135).
Pilchuck Creek (05.0062)
Canyon Creek (05.0359)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

None.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

For Sections 2 & 3 please refer to the Stillaguamish Tribal Summer Chinook HGMP for details.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

None

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) <u>Description of ESA-listed salmonid population(s) affected by the program.</u>

- Identify the ESA-listed population(s) that will be <u>directly</u> affected by the program.
None

- Identify the ESA-listed population(s) that may be <u>incidentally</u> affected by the program.

Stillaguamish chinook and bull trout.

2.2.2) <u>Status of ESA-listed salmonid population(s) affected by the program.</u>

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds (*see definitions in "Attachment 1").*

Critical and viable population threshholds under ESA have not been determined, however, the SASSI report (WDFW) determined this population (Stillaguamish Summer Chinook), to be "depressed".

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Chinook Spawner Abundance:

Broodyear	# of Spawners
89	811
90	842
91	1,632
92	780
93	928
94	954
95	822
96	1,384
97	1,153
98	1,540
99	1,098
00	1,633

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

2.2.3) <u>Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take</u> *(see "Attachment 1" for definition of "take")*.
- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

The release of fish as described in this HGMP could potentially result in ecological interactions with listed species. These potential ecological interactions are discussed in Section 3.5, and risk control measures are discussed in Section 10.11. Implementation of the program modifications provided in this HGMP, and the actions previously taken by the comanagers, are anticipated to contribute to the continued improvement in the abundance of listed salmonids.

Broodstocking of steelhead occurs between December and March while summer chinook are captured on the river between early August and early September.

- **Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish**.

None

- **Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**
*Complete the appended "take table" (**Table 1**) for this purpose. Provide a range of potential take numbers to account for alternate or "worst case" scenarios.*

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

Harvest management plans with the Stilliguamish and Tulalip Tribes.

3.3) Relationship to harvest objectives.

Provide recreational and tribal harvest opportunity.

3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

Stillaguamish River recreational and Tulalip Tribal fishery.

3.4) Relationship to habitat protection and recovery strategies.

The comanagers' resource management plans for artificial production in Puget Sound are expected to be one component of a recovery plan for Puget Sound chinook under development through the Shared Strategy process. Several important analyses have been completed, including the identification of populations of Puget Sound chinook, but further development of the plan may result in an improved understanding of the habitat, harvest, and hatchery actions required for recovery of Puget Sound chinook.

3.5) Ecological interactions.

______The program described in this HGMP interacts with the biotic and abiotic components of the freshwater, estuarine, and marine salmonid ecosystem through a complex web of short and longterm processes. The complexity of this web means that secondary or tertiary interactions (both positive and negative) with listed species could occur in multiple time periods, and that evaluation of the net effect can be difficult. WDFW is not aware of any studies that have directly evaluated the ecological effects of this program. Alternatively, we provide in this section a brief summary of empirical information and theoretical analyses of three types of ecological interactions, nutrient enhancement, predation, and competition, that may be relevant to this program. Recent reviews by Fresh (1997), Flagg et al. (2000), and Stockner (2003) can be consulted for additional information; NMFS (2002) provides an extensive review and application to ESA permitting of artificial production programs.

Nutrient Enhancement

Adults originating from this program that return to natural spawning areas may provide a source of nutrients in oligotrohic coastal river systems and stimulate stream productivity. Many watersheds in the Pacific Northwest appear to be nutrient-limited (Gregory et al. 1987; Kline et al. 1997) and salmonid carcasses can be an important source of marine derived nutrients (Levy 1997). Carcasses from returning adult salmon have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity

(Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of aquatic invertebrates (Mathisen et al. 1988); and 3) juvenile salmonids have been observed to feed directly on the carcasses (Bilby et al. 1996). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward 1993; Slaney et al. 2003; Ward et al. 2003).

Predation – Freshwater Environment
Coho and steelhead released from hatchery programs may prey upon listed species of salmonids, but the magnitude of predation will depend upon the characteristic of the listed population of salmonids, the habitat in which the population occurs, and the characteristics of the hatchery program (e.g., release time, release location, number released, and size of fish released). The site specific nature of predation, and the limited number of empirical studies that have been conducted, make it difficult to predict the predation effects of any specific hatchery program. WDFW is unaware of any studies that have empirically estimated the predation risks to listed species posed by the program described in this HGMP.

In the absence of site-specific empirical information, the identification of risk factors can be a useful tool for reviewing hatchery programs while monitoring and research programs are developed and implemented. Risk factors for evaluating the potential for significant predation include the following:

Environmental Characteristics. Water clarity and temperature, channel size and configuration, and river flow are among the environmental characteristics that can influence the likelihood that predation will occur (see SWIG (1984) for a review). The SIWG (1984) concluded that the potential for predation is greatest in small streams with flow and turbidity conditions conducive to high visibility.

Relative Body Size. The potential for predation is limited by the relative body size of fish released from the program and the size of prey. Generally, salmonid predators are thought to prey on fish approximately 1/3 or less their length (USFWS 1994), although coho salmon have been observed to consume juvenile chinook salmon of up to 46% of their total length (Pearsons et al. 1998). The lengths of juvenile migrant chinook salmon originating from natural production have been monitored in numerous watersheds throughout Puget Sound, including the Skagit River , Stillaguamish River, Bear Creek, Cedar River, Green River, Puyallup River, and Dungeness River. The average size of migrant chinook salmon is typically 40mm or less in February and March, but increases in the period from April through June as emergence is completed and growth commences (Table 3.5.1). Assuming that the prey item can be no greater than 1/3 the length of the predator, Table 3.5.1 can be used to determine the length of predator required to consume a chinook salmon of average length in each time period. The increasing length of natural origin juvenile chinook salmon from March through June indicates that delaying the release hatchery smolts of a fixed size will reduce the risks associated with predation.

Table 3.5.1. Average length by statistical week of natural origin juvenile chinook salmon migrants captured in traps in Puget Sound watersheds. The minimum predator length

corresponding to the average length of chinook salmon migrants, assuming that the prey can be no greater than 1/3 the length of the predator, are provided in the final row of the table. (NS: not sampled.)

Watershed	Statistical Week										
	16	17	18	19	20	21	22	23	24	25	26
Skagit [1] 1997-2001	43.2	48.3	50.6	51.7	56.1	59.0	58.0	60.3	61.7	66.5	68.0
Stillaguamish [2] 2001-2002	51.4	53.5	55.7	57.8	60.0	62.1	64.2	66.4	68.5	70.6	72.8
Cedar [3] 1998-2000	54.9	64.2	66.5	70.2	75.3	77.5	80.7	85.5	89.7	99.0	113
Green [4] 2000	52.1	57.2	59.6	63.1	68.1	69.5	NS	79.0	82.4	79.4	76.3
Puyallup [5] 2002	NS	NS	NS	66.2	62.0	70.3	73.7	72.7	78.7	80.0	82.3
Dungeness [6] 1996-1997	NS	NS	NS	NS	NS	NS	NS	NS	77.9	78.8	81.8
All Systems Average Length	50.4	55.8	58.1	61.8	64.3	67.7	69.2	72.8	76.5	79.0	82.4
Minimum Predator Length	153	169	176	187	195	205	210	221	232	239	250

Sources:

[1] Data are from Seiler et al. (1998); Seiler et al. (1999); Seiler et al. (2000); Seiler et al. (2001), and Seiler et al. (2002)..

[2] Data are from regression models presented in Griffith et al. (2001) and Griffith et al. (2003).

[3] Data are from Seiler et al. (2003).

[4] Data are from Seiler et. (2002).

[5] Data are from Samarin and Sebastian (2002).

[6] Data are from Marlowe et al. (2001).

Date of Release. The release date of juvenile fish for the program can influence the likelihood that listed species are encountered or are of a size that is small enough to be consumed. The most extensive studies of the migration timing of naturally produced juvenile chinook salmon in the Puget Sound ESU have been conducted in the Skagit River, Bear Creek, Cedar River, and the Green River. Although distinct differences are evident in the timing of migration between watersheds, several general patterns are beginning to emerge:

1) Emigration occurs over a prolonged period, beginning soon after enough emergence (typically January) and continuing at least until July;
2) Two broad peaks in migration are often present during the January through July

time period; an early season peak (typically in March) comprised of relatively small chinook salmon (40-45mm), and a second peak in mid-May to June comprised of larger chinook salmon;
3) On average, over 80% of the juvenile chinook have migrated past the trapping locations after statistical week 23 (usually occurring in the first week of June).

Table 3.5.2. Average cumulative proportion of the total number of natural origin juvenile chinook salmon migrants estimated to have migrated past traps in Puget Sound watersheds.

Watershed	Statistical Week										
	16	17	18	19	20	21	22	23	24	25	26
Skagit [1] 1997-2001	0.61	0.64	0.68	0.73	0.76	0.78	0.83	0.86	0.90	0.92	0.94
Bear [2] 1999-2000	0.26	0.27	0.28	0.32	0.41	0.52	0.73	0.84	0.92	0.96	0.97
Cedar [2] 1999-2000	0.76	0.76	.0.76	0.77	0.79	0.80	0.82	0.84	0.87	0.88	0.90
Green [3] 2000	0.63	0.63	0.64	0.69	0.77	0.79	0.84	0.86	0.88	0.98	1.00
All Systems Average	0.56	0.58	0.59	0.63	0.68	0.72	0.80	0.85	0.89	0.94	0.95

Sources:

[1] Data are from Seiler et al. (1998); Seiler et al. (1999); Seiler et al. (2000); Seiler et al. (2001), and Seiler et al. (2002)..

[2] Data are from Seiler et al. (2003).

[3] Data are from Seiler et. (2002).

Release Location and Release Type. The likelihood of predation may also be affected by the location and type of release. Other factors being equal, the risk of predation may increase with the length of time the fish released from the artificial production program are commingled with the listed species. In the freshwater environment, this is likely to be affected by distribution of the listed species in the watershed, the location of the release, and the speed at which fish released from the program migrate from the watershed.

Coho salmon and steelhead released from western Washington artificial production programs as smolts have typically been found to migrate rapidly downstream. Data from Seiler et al. (1997; 2000) indicate that coho smolts released from the Marblemount Hatchery on the Skagit River migrate approximately 11.2 river miles day. Steelhead smolts released onstation may travel even more rapidly – migration rates of approximately 20 river miles per day have been observed in the Cowlitz River (Harza 1998). However, trucking fish to offstation release sites, particularly release sites located outside of the watershed in which the fish have been reared, may slow migrations speeds

(Table 3.5.3).

Table 3.5.3. Summary of travel speeds for steelhead smolts for several types of release strategies.

Location	Release Type	Migration Speed (river miles per day)	Source
Cowlitz River	Smolts, onstation	21.3	Harza (1998)
Kalama River	Trucked from facility located within watershed in which fish were released.	4.4	Hulett (pers. comm.)
Bingham Creek	Trucked from facility located outside of watershed in which fish were released.	0.6	Seiler et. al. (1997)
Stevens Creek	Trucked from facility located outside of watershed in which fish were released.	0.5	Seiler et. al. (1997)
Snow Creek	Trucked from facility located outside of watershed in which fish were released.	0.4	Seiler et. al. (1997)

Number Released. Increasing the number of fish released from an artificial production program may increase the risk of predation, although competition between predators for prey may eventually limit the total consumption (Peterman and Gatto 1978).

Predation – Marine Environment

WDFW is unaware of any studies that have empirically estimated the predation risks to listed species posed by the program described in this HGMP. NMFS (2002) reviewed existing information on the risks of predation in the marine environment posed by artificial production programs and concluded:

> "1) Predation by hatchery fish on natural-origin smolts or sub-adults is less likely to occur than predation on fry. Coho and chinook salmon, after entering the marine environment, generally prey upon fish one-half their length or less and consume, on average, fish prey that is less than one-fifth of their length (Brodeur 1991). During early marine life, predation on natural origin chinook, coho, and steelhead will likely be highest in situations where large, yearling-sized hatchery fish encounter sub-yearling fish or fry (SIWG 1984)."
>
> "2) However, extensive stomach content analysis of coho salmon smolts collected through several studies in marine waters of Puget Sound, Washington do not substantiate any indication of significant predation upon juvenile salmonids (Simestad and Kinney 1978)."
>
> "3) Likely reasons for apparent low predation rates on salmon juveniles,

including chinook, by larger chinook and other marine predators are described by Cardwell and Fresh (1979). These reasons included: 1) due to rapid growth, fry are better able to elude predators and are accessible to a smaller proportion of predators due to size alone; 2) because fry have dispersed, they are present in low densities relative to other fish and invertebrate prey; and 3) there has either been learning or selection for some predator avoidance."

Competition
WDFW is unaware of any studies that have empirically estimated the competition risks to listed species posed by the program described in this HGMP. Studies conducted in other areas indicate that this program is likely to pose a minimal risk of competition:

1) As discussed above, coho salmon and steelhead released from hatchery programs as smolts typically migrate rapidly downstream. The SIWG (1984) concluded that "migrant fish will likely be present for too short a period to compete with resident salmonids."
2) NMFS (2002) noted that "..where interspecific populations have evolved sympatrically, chinook salmon and steelhead have evolved slight differences in habitat use patterns that minimize their interactions with coho salmon (Nilsson 1967; Lister and Genoe 1970; Taylor 1991). Along with the habitat differences exhibited by coho and steelhead, they also show differences in foraging behavior. Peterson (1966) and Johnston (1967) reported that juvenile coho are surface oriented and feed primarily on drifting and flying insects, while steelhead are bottom oriented and feed largely on benthic invertebrates."
3) Flagg et al. (2000) concluded, "By definition, hatchery and wild salmonids will not compete unless they require the same limiting resource. Thus, the modern enhancement strategy of releasing salmon and steelhead trout as smolts markedly reduces the potential for hatchery and wild fish to compete for resources in the freshwater rearing environment. Miller (1953), Hochachka (1961), and Reimers (1963), among others, have noted that this potential for competition is further reduced by the fact that many hatchery salmonids have developed different habitat and dietary behavior than wild salmonids." Flagg et al (2000) also stated "It is unclear whether or not hatchery and wild chinook salmon utilize similar or different resources in the estuarine environment."
4) Fresh (1997) noted that "Few studies have clearly established the role of competition and predation in anadromous population declines, especially in marine habitats. A major reason for the uncertainty in the available data is the complexity and dynamic nature of competition and predation; a small change in one variable (e.g., prey size) significantly changes outcomes of competition and predation. In addition, large data gaps exist in our understanding of these interactions. For instance, evaluating the impact of introduced fishes is impossible because we do not know which nonnative fishes occur in many salmon-producing watersheds. Most available information is circumstantial. While such information can identify where inter- or intra specific relationships may occur, it does not test mechanisms explaining why observed relations exist. Thus, competition and predation are usually one of several plausible hypotheses

explaining observed results."

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Whitehorse Hatchery is supplied by spring water from Whitehorse Spring. It has a seasonal flow range of 90 gallons per minute (gpm) in low flow years to peak flows of 2,800 gpm in the spring. Minimum flows during the time chinook are reared at the hatchery are above 800 gpm. Dissolved oxygen (DO) levels in this water supply range from 9 parts per million (ppm) to 10.5 ppm and temperature range from a low of 41 degrees Fahrenheit to highs of 55 degrees Fahrenheit.

The Whitehorse facility meets current NPDES permit standards. There is no fish passage into the hatchery spring water supply.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

The hatchery intakes at the facility conform with NMFS screening guidelines to minimize the risk of entrainment of juvenile listed fish. There are no listed fish released above the hatchery intake.

The Hatchery Scientific Review Group (HSRG) has recommended that additional water be developed and infrastructure changes be made to support both steelhead and the recovery program for the NF Stilliguamish summer chinook ($300,000 has been proposed in Governor Locke's "Economic Stimulus" budget package).

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Returning volunteers are trapped in an off-channel (off the Stillaguamish River) trap which is situated in the hatchery outlet channel.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Standard 900 gallon non-insulated tank mounted on a truck. Compressed oxygen and 12V aerators are included.

5.3) Broodstock holding and spawning facilities.

Fish are held in two 10' X 50' X 2.5' raceways.

5.4) Incubation facilities.

Eggs are incubated in 4 gallon isolation buckets until eyed. When IHNV tests return negative, they are transferred to Arlington Hatchery for early rearing and adipose-fin clipping.

5.5) Rearing facilities.

Fish are reared in a 1.75 acre dirt bottom semi-natural rearing pond at Whitehorse.

5.6) Acclimation/release facilities.

Same as the rearing pond.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Listed Stillaguamish chinook are reared at the facility but there is no natural production in the hatchery creek. Whitehorse Hatchery is supplied by a gravity fed spring water supply from Whitehorse Spring. Alarm systems are in place in case of water loss. Flooding has not been an issue since the spring water source is very stable.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Fish return as volunteers into the Whitehorse Hatchery trap (N.F. Stilliguamish River). The stock originated from Chambers Creek (South Puget Sound).

6.2) Supporting information.

6.2.1) History.

The program began with Chambers Creek Hatchery winter steelhead. Hatchery origin adults which returned to Whitehorse were often spawned and the eggs shipped to Chambers Creek for incubation, early rearing and clipping prior to being returned to Whitehorse. Occasionally, adults were shipped to Chambers Creek for holding and spawning. In the early 1980s', and IHN outbreak at Chambers Creek, required that all incubation of eggs from Whitehorse adult returns be undertaken in-basin. The program has been mostly self-sufficient since then.

6.2.2) Annual size.

150 to 200 pairs of adults.

6.2.3) Past and proposed level of natural fish in broodstock.

None.

6.2.4) Genetic or ecological differences.

The hatchery steelhead stock is distinct from the native steelhead. They originate from the Chambers Creek Hatchery returns and are distinct in their return timing of December-early February versus the February-early May for the wild fish.

6.2.5) Reasons for choosing.

Most locally adapted hatchery stock available.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

NA

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults.

7.2) Collection or sampling design.

Fish are captured as volunteers into the Whitehorse trap.

7.3) Identity.

All hatchery returns have an adipose-fin clip.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

150 to 200 fish

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	Adults Females	Males	Jacks	Eggs	Juveniles
1988					
1989					
1990					
1991					
1992					
1993					
1994	95	117	0	340,000	
1995	129	64	0	413,539	
1996	113	87	0	358,208	
1997	60	78	0	233,988	
1998	31	63	0	166,188	
1999	86	102	0	271,452	
2000	77	47 (39 live spawned)		269,100	
2001	50	15 (29 live spawned)		180,000	

Data source:

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

After egg take goals are reached the remaining adults are held until they spawn out in the raceways (about March 1st). They are then released into Whitehorse Spring Creek and allowed to return to the N.F. Stillaguamish River.

7.6) Fish transportation and holding methods.

Fish are transported from the trap to the holding/spawning raceways using a 100 gallon cattle watering trough and a pickup truck.

7.7) Describe fish health maintenance and sanitation procedures applied.

All fish are periodically monitored by Fish Health Specialist.

7.8) Disposition of carcasses.

Edible carcasses are distributed to approved charitable organizations. Non-edible carcasses are used for local stream nutrient enhancement.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

NA

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

All fish are selected and spawned randomly.

8.2) Males.

Males are spawned in 5 fish pools

8.3) Fertilization.

Females are spawned in 5 fish pools and fertilized with pooled sperm.

8.4) Cryopreserved gametes.

NA

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

NA

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

The egg take goal is 250,000 eggs. Loss averages 10% to the eyed egg stage and 10% loss to ponding (see section 7.4.2 table).

9.1.2) Cause for, and disposition of surplus egg takes.

Egg takes are managed closely to minimize the risk of surplus eggs. Surplus eggs may be shipped to other hatcheries to cover shortages elsewhere should they arise. After that, surplus fry may be planted in regional lakes with no outlet.

9.1.3) Loading densities applied during incubation.

Up to 20,000 eggs are incubated (to the eyed stage) per 4 gallon isolation bucket.

9.1.4) Incubation conditions.

1 gallon per minute inflow of spring water at 45 to 47 degrees Fahrenheit for each isolation bucket.

9.1.5) Ponding.

Fish are hatched and ponded at the Arlington Hatchery. They remain at the Arlington Hatchery until they are about 100 fish per pound (fpp) in July. They are then returned to Whitehorse.

9.1.6) Fish health maintenance and monitoring.

Eggs and fry are checked periodically by a Fish Health Specialist. Fish are checked by Fish Health Specialist prior to ponding.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

NA

9.2) <u>Rearing</u>:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Fry to fingerling at about 96%. Since covereing the rearing pond in 1998 we have experienced about 85% survival from fingerling to smolt.

9.2.2) Density and loading criteria (goals and actual levels).

Goals are: flow index of 2.1 or lower. Actual flow index can reach 2.25 with a density index of 0.01.

9.2.3) Fish rearing conditions

Fish are reared at Arlinton Hatchery until they are 100 fpp. They are then moved to Whitehorse Rearing Pond and reared to smolts in a 1.75 acre semi-natural rearing pond using spring water.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Not available.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Not available.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

These fish are fed Moore-Clark Nutra Fry until about 100 fpp then switched to Rangen's Steelhead dry pellet. Fish are started at about 4.3% B.W./day and finish up as smolts being fed about 1.2% B.W./day with an expected conversion rate of 80%.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Fish are sampled during rearing for the incidence of disease in accordance with the Co-Managers Fish Health Policy. Monthly monitoring exams take place to detect pathogens of concern. Fish vaccines may be used to prevent epizootics associated with two bacterial diseases (vibriosis and enteric redmouth disease). In the event of disease epizootics or elevated mortality, fish pathologists are available to diagnose problems and provide treatment recommendations.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

Not applicable.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

At the Whitehorse acclimation site, fish have access to significant populations of terrestrial and aquatic insects within the gravel-lined rearing pond.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

The Hatchery Scientific Review Group (HSRG) has recommended that additional water be developed (increase flows) and infrastructure changes be made to support both steelhead and the recovery program for the NF Stilliguamish summer chinook ($300,000 has been proposed in Governor Locke's "Economic Stimulus" budget package). These changes would focus on improving water quality and quantity which, in turn, would improve smolt quality and eliminate any disease problems.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels. *(Use standardized life stage definitions by species presented in **Attachment 2**. "Location" is watershed planted (e.g. "Elwha River").)*

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling				

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Yearling	110,000 10,000 10,000	6 6 6	May May May	Whitehorse Pond* Pilchuck Creek* Canyon Cr.*

*Implementation with 2004 releases.

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: Stilliguamish River (05)

Release point: Whitehorse Spring Creek (05.0254A) RM 1.5 to confluence with N.F. Stillaguamish which is at RM 28 from confluence to mainstem Stillaguamish River. Pilchuck Creek (05.0062), Canyon Creek (05.0359)

Major watershed: Stillaguamish River (05.)

Basin or Region: Puget Sound

10.3) Actual numbers and sizes of fish released by age class through the program.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988								
1989								
1990								
1991								
1992								
1993								
1994								
1995							178,325	6
1996							169,705	5
1997							121,862	6
1998							157,953	5
1999							140,418	6
2000							129,827	5
2001							150,131	6
Average							149,746	6

Data source: Whitehorse pond hatchery records.

10.4) Actual dates of release and description of release protocols.

Most fish are released between May1st and May 15th.

10.5) Fish transportation procedures, if applicable.

NA

10.6) Acclimation procedures (*methods applied and length of time*).

Reared on site of release.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

All hatchery steelhead are adipose-fin clipped.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Programmed levels will be controlled by limiting the number of broodstock collected. Fish are enumerated at time of fin clipping.

10.9) Fish health certification procedures applied pre-release.

These winter steelhead are health certified in accordance with the Co-Managers Fish Health Policy within two weeks of their scheduled release.

10.10) Emergency release procedures in response to flooding or water system failure.

None. On spring water.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

To minimize the risk of residualization and impact upon natural fish, hatchery yearlings are released in May as smolts and only in the Stillaguamish River watershed. All fish released are mass marked.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

The comanagers conduct numerous ongoing monitor programs, including catch, escapement, marking, tagging, and fish health testing. The focus of enhanced monitoring and evaluation programs will be on the risks posed by ecological interactions with listed species. WDFW is proceeding on four tracks:

1) An ongoing research program conducted by Duffy et al. (2002) is assessing the nearshore distribution, size structure, and trophic interactions of juvenile salmon, and potential predators and competitors, in northern and southern Puget Sound. Funding is provided through the federal Hatchery Scientific Review Group.

2) A three year study of the estuarine and early marine use of Sinclair Inlet by juvenile salmonids is nearing completion. The project has four objectives:

a) Assess the spatial and temporal use of littoral habitats by juvenile chinook throughout the time these fish are available in the inlet;

b) Assess the use of offshore (i.e., non-littoral) habitats by juvenile chinook;

c) Determine how long cohorts of juvenile chinook salmon are present in Sinclair inlet;

d) Examine the trophic ecology of juvenile chinook in Sinclair Inlet. This will consist of evaluating the diets of wild chinook salmon and some of their potential predators and competitors. Funding is provided by the USDD-Navy.

3) WDFW is developing the design for a research project to assess the risks of predation on listed species by coho salmon and steelhead released from artificial production programs. Questions which this project will address include:

a) How does trucking and the source of fish (within watershed or out of watershed) affect the migration rate of juvenile steelhead?

b) How many juvenile chinook salmon of natural origin do coho salmon and steelhead consume?

c) What is the rate of residualism of steelhead in Puget Sound rivers?

Funding needs have not yet been quanitifed, but would likely be met through a combination of federal and state sources.

4) WDFW is assisting the Hatchery Scientific Review Group in the development of a template for a regional monitoring plan. The template will provide an integrated assessment of hatchery and wild populations.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

See Section 11.1.1.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Risk aversion measures will be developed in conjunction with the monitoring and evaluation plans.

SECTION 12. RESEARCH

12.1) Objective or purpose.

Currently, there is no research being conducted utilizing Whitehorse winter steelhead.

12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

12.6) Dates or time period in which research activity occurs.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

12.8) Expected type and effects of take and potential for injury or mortality.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table

1).

12.10) Alternative methods to achieve project objectives.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

SECTION 13. ATTACHMENTS AND CITATIONS

Bilby, R.E., B.R. Fransen, and P.A. Bisson. 1996. Incorporation of nitrogen and carbon from spawning coho salmon into the trophic system of small streams: evidence from stable isotopes. Can. J. Fish. Aquat. Scit. 53: 164-173.

Brodeur, R. D. 1991. Ontogenetic variations in the type and size of prey consumed by juvenile coho, Oncohynchus kisutch, and chinook, O. tshawytscha, salmon. Environ. Biol. Fishes 30: 303-315.

Cardwell, R.D., and K.L. Fresh. 1979. Predation upon juvenile salmon. Draft technical paper, September 13, 1979. Washington Department of Fisheries. Olympia, Washington.

Flagg, T.A., B.A. Berejikian, J.E. Colt, W.W. Dickhoff, L.W. Harrell, D.J. Maynard, C.E. Nash, M.S. Strom, R.N. Iwamoto, and C.V.W. Mahnken. 2000. Ecological and behavioral impacts of artificial production strategies on the abundance of wild salmon populations. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-41: 92p.

Fresh, K.L. 1997. The role of competition and predation in the decline of Pacific salmon and steelhead. *In* D.J. Stouder, P.A. Bisson, and R.J. Naiman (editors), Pacific salmon and their ecosystems: status and future options, p. 245-275. Chapman Hall, New York.

Gregory, S.V., G.A. Lamberti, D.C. Erman, K.V. Koski, M.L. Murphy, and J.R. Sedell. 1987. Influence of forest practices on aquatic production. *In* E.O. Salo and T.W. Cundy (editors), Streamside management: forestry and fishery interactions. Institute of Forest Resources, University of Washington, Seattle, Washington.

Griffith, J., R. Rogers, J. Drotts, and P. Stevenson. 2001. 2001 Stillaguamish River smolt trapping project. Stillaguamish Tribe of Indians, Arlington, Washington.

Griffith, J., R. Rogers, J. Drotts, and P. Stevenson. 2003. 2002 Stillaguamish River smolt trapping project. Stillaguamish Tribe of Indians, Arlington, Washington.

Harza. 1999. The 1997 and 1998 technical study reports, Cowlitz River Hydroelectric Project. Vol 2, pp 35-42.

Hochachka, P.W. 1961. Liver glycogen reserves of interacting resident and introduced trout populations. Can. J. Fish. Aquat. Sci. 48: 125-135.

Johnston, J.M. 1967. Food and feeding habits of juvenile coho salmon and steelhead trout in Worthy Creek, Washington. Master's thesis, University of Washington, Seattle.

Kline, T.C., J.J. Goring, Q.A. Mathisen, and P.H. Poe. 1990. Recycling of elements transported upstream by runs of Pacific salmon: I ^{15}N and ^{13}C evidence in Sashin Creek, southeastern Alaska. Can. J. Fish. Aquat. Sci. 47: 136-144.

Levy, S. 1997. Pacific salmon bring it all back home. BioScience 47: 657-660.

Lister, D.B., and H.S. Genoe. 1970. Stream habitat utilization by cohabiting underyearlings of chinook (Oncorhynchus tshawytscha) and coho (O. kisutch) in the Big Qualicum River, British Columbia. J. Fish. Res. Board. Can. 27: 1215-1224.

Marlowe, C., B. Freymond, R.W. Rogers, and G. Volkhardt. 2001. Dungeness River chinook salmon rebuilding project: progress report 1993-1998. Report FPA 00-24. Washington Department of Fish and Wildlife, Olympia, Washington.

Mathisen, O.A., P.L. Parker, J.J. Goering, T.C. Kline, P.H. Poe, and R.S. Scalan. 1988. Recycling of marine elements transported into freshwater systems by anadromous salmon. Verh. Int. Ver. Limnol. 23: 2249-2258.

Miller, R.B. 1953. Comparative survival of wild and hatchery-reared cutthroat trout in a stream. Trans. Am. Fish. Soc. 83: 120-130.

NMFS (National Marine Fisheries Service). 2002. Biological opinion on artificial propagation in the Hood Canal and eastern Strait of Juan de Fuca regions of Washington State. National Marine Fisheries Service, Northwest Region.

Pearsons, T.N., G.A. McMichael, K.D. Ham, E.L. Bartrand, A. l. Fritts, and C. W. Hopley. 1998. Yakima River species interactions studies. Progress report 1995-1997 submitted to Bonneville Power Administration, Portland, Oregon. DOE/BP-64878-6.

Peterman, R.M., and M. Gatto. 1978. Estimation of the functional responses of predators on juvenile salmon. J. Fish. Res. Board Can. 35: 797-808.

Peterson, G.R. 1966. The relationship of invertebrate drift abundance to the standing crop of benthic drift abundance to the standing crop of benthic organisms in a small stream. Master's thesis, Univ. of British Columbia, Vancouver.

Reimers, N. 1963. Body condition, water temperature, and over-winter survival of hatchery reared trout in Convict Creek, California. Trans. Am. Fish. Soc. 92: 39-46.

Samarin, P., and T. Sebastian. 2002. Salmon smolt catch by a rotary screwtrap operated in the Puyallup River: 2002. Puyallup Indian Tribe.

Seidel, Paul, 1983, Spawning Guidelines for Washington Department of Fish and Wildlife Hatcheries, Washington Department of Fish and Wildlife, Olympia

Seiler, D., L. Kishimoto, and S. Neuhauser. 1998. 1997 Skagit River wild 0+ chinook production evaluation. Contract report to Seattle City Light. Washington Department of Fish and Wildlife, Olympia, Washington.

Seiler, D., L. Kishimoto, and S. Neuhauser. 1999. 1998 Skagit River wild 0+ chinook production evaluation. Contract report to Seattle City Light. Washington Department of Fish and Wildlife, Olympia, Washington.

Seiler, D., L. Kishimoto, and S. Neuhauser. 2000. 1999 Skagit River wild 0+ chinook production evaluation. Contract report to Seattle City Light. Washington Department of Fish and Wildlife, Olympia, Washington.

Seiler, D., L. Kishimoto, and S. Neuhauser. 2001. 2000 Skagit River wild 0+ chinook production evaluation. Contract report to Seattle City Light. Washington Department of Fish and Wildlife, Olympia, Washington.

Seiler, D., L. Kishimoto, and S. Neuhauser. 2002. 2001 Skagit River wild 0+ chinook production evaluation. Contract report to Seattle City Light. Report FPA 02-11. Washington Department of Fish and Wildlife, Olympia, Washington.

Seiler, D., G. Volkhardt, and L. Kishimoto. 2003. Evaluation of downstream migrant salmon production in 1999 and 2000 from three Lake Washington tributaries: Cedar River, Bear Creek, and Issaquah Creek. Report FPA 02-07. Washington Department of Fish and Wildlife, Olympia, Washington.

Seiler, D., G. Volkhardt, L. Kishimoto, and P. Topping. 2002. 2000 Green River juvenile salmonid production evaluation. Report FPT 02-03. Washington Department of Fish and Wildlife, Olympia, Washington.

Simenstad, C.A., and W.J. Kinney. 1978. Trophic relationships of out-migrating chum salmon in Hood Canal, Washington, 1977. Univ. of Washington, Fish. Res. Inst., Final Rep., FRI-UW-8026.

Slaney, P.A., B.R. Ward. 1993. Experimental fertilization of nutrient deficient streams in British Columbia. *In* G. Schooner and S. Asselin (editors), Le developpmente du saumon Atlantique au Quebec: connaitre les regles du jeu pour reussir. Colloque international e la Federation quebecoise pour le saumon atlantique, p. 128-141. Quebec, decembre 1992. Collection *Salmo salar* n°1.

Slaney, P.A., B.R. Ward, and J.C. Wightman. 2003. Experimental nutrient addition to the Keogh River and application to the Salmon River in coastal British Columbia. *In* J.G. Stockner,(editor), Nutrients in salmonid ecosystems: sustaining production and biodiversity, p. 111-126. American Fisheries Society, Symposium 34, Bethesda, Maryland.

SIWG (Species Interaction Work Group). 1984. Evaluation of potential species interaction effects in the planning and selection of salmonid enhancement projects. J. Rensel, chairman and K. Fresh, editor. Report prepared for the Enhancement Planning Team for implementation of the Salmon and Steelhead Conservation and Enhancement Act of 1980. Washington Department of Fisheries. Olympia, WA. 80pp.

Stockner, J. G., editor. 2003. Nutrients in salmonid ecosystems: sustaining production and biodiversity. American Fisheries Society, Symposium 34, Bethesda, Maryland.

USFWS (U.S. Fish and Wildlife Service). 1994. Biological assessment for operation of U.S. Fish and Wildlife Service operated or funded hatcheries in the Columbia River Basin in 1995-1998. Submitted to National Marine Fisheries Service (NMFS) under cover letter, dated August 2, 1994, from William F. Shake, Acting USFWS Regional Director, to Brian Brown, NMFS.

Washington Department of Fish and Wildlife and Washington Treaty Indian Tribes. 1998. Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State. Olympia.

Ward, B.R., D.J.F. McCubbing, and P.A. Slaney. 2003. Evaluation of the addition of inorganic nutrients and stream habitat structures in the Keogh River watershed for steelhead trout and coho salmon. . *In* J.G. Stockner,(editor), Nutrients in salmonid ecosystems: sustaining production and biodiversity, p. 127-147. American Fisheries Society, Symposium 34, Bethesda, Maryland.

Wipfli, M.S., J. Hudson, and J. Caouette. 1998 Influence of salmon carcasses on stream productivity: response of biofilm and benthic macroinvertebrates in southeastern Alaska, U.S.A. Can J. Fish. Aquat. Sci. 55: 1503-1511.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____________________________ Date:_____________

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Chinook ESU/Population: Puget Sound Activity: Winter Steelhead Rearing				
Location of hatchery activity: Whitehorse Hatchery Dates of activity: December to May Hatchery program operator: WDFW				
Type of Take	Annual Take of Listed Fish By Life Stage (*Number of Fish*)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)	Unknown	Unknown		
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. *An entry for a fish to be taken should be in the take category that describes the greatest impact.*
2. *Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
3. *If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.*